

REMARKS

Reconsideration and allowance of this application are respectfully requested.

Claims 1, 7-11, and 15-17 stand rejected as anticipated by Heinecke et al. '690. It is respectfully suggested that this rejection is in error.

Claim 1 requires the creation of a plasma by establishing an RF eletromagnetic field within a reactor chamber. Claim 1 also requires that the RF electromagnetic field have an energy level which varies cyclically between at least two values, each sufficient to maintain the plasma.

Heinecke et al. '690 teaches a plasma processing method that employs an RF field to create a plasma. The RF field is turned on and off. When the RF field of Heinecke et al. is on, the field has a single energy level (e.g., 100w/cc, see Column 2, Line 10). Absolutely no suggestion exists in Heinecke et al. to vary the amplitude of the electromagnetic field, or correspondingly, the energy level of the field, during the time that the field is turned on. However, the field is turned off. As indicated at Column 2, Lines 44-46, the RF field is left on for such a short period of time that substantially no gas exchange occurs during the RF pulse. Column 2, Lines 36-38 indicate that the RF pulse repetition frequency is set to equal the gas exchange time. Thus, the RF field is turned off for a much higher percentage of the time than it is turned on. When the RF field is turned off, the plasma extinguishes very quickly.

Thus, for the time that the field is turned on, there is no indication in Heinecke et al. that the energy level varies at all, even though the eletromagnetic field is an RF electromagnetic field. Furthermore, the field off state cannot represent one of the energy levels referred to in Claim 1 since Claim 1 requires that each energy level be sufficient to maintain the plasma. Therefore, Heinecke et al. '690 does not anticipate Claim 1.

Claims 7-11 and 15-17, either directly or indirectly dependent on Claim 1, are patentable for the reasons discussed above with the respect to Claim 1. Furthermore, these claims include additional limitations which further distinguish from the cited reference.

Claims 1-3, 7-11 and 15-17 stand rejected as obvious over Heinecke et al. '690.

As noted above, Heinecke et al. neither discloses nor suggests causing the RF electromagnetic field to have an energy level which varies between at least two values, each sufficient to maintain a plasma. Therefore, Heinecke et al. does not render obvious these

claims. Please note that although RF power applied to the chamber may have a sinusoidal form, the resulting electromagnetic field does not have an energy level which varies between at least two values.

Claims 4-6 and 18 stand rejected as obvious over Heinecke et al. '690 in view of Heinecke et al. '661.

Claims 4-6 and 18, all dependent either directly or indirectly on Claim 1, are patentable for the reasons discussed above with respect to claim 1. Heinecke et al. '661 does not overcome the deficiencies of Heinecke '690 since it does not teach an RF electromagnetic field having an energy level which varies between at least two values, each sufficient to maintain the plasma.

Claims 12-14 stand rejected as obvious over Heinecke et al. '690 in view of Ooiwa et al. ~~Claims 12-14, indirectly dependent on Claim 1, are patentable for the reasons discussed~~ above with regard to Claim 1. Ooiwa et al. does not compensate for the deficiencies of Heinecke et al. '690 since it does not teach RF electromagnetic field having an energy level which varies between at least two values, each sufficient to maintain the plasma.

Claims 19-21, 23, 24 and 26 stand rejected as being obvious over Heinecke et al. '690 in view of Mahawili. It is respectfully suggested that the claims have been amended to obviate this rejection.

Claim 19 has been amended to recite that the RF electromagnetic field has an energy level which varies between at least two values, each sufficient to maintain the plasma. As noted above with regard to Claim 1, Heinecke et al. '690 fails to teach this feature. Furthermore, Mahawili also fails to teach this feature. Therefore, Claims 19-21, 23, 24 and 26 are patentable over this combination.

Claim 22 stands rejected as being obvious over Heinecke '609 in view of Mahawili and Bates et al. Claim 25 stands rejected as being obvious over Heinecke et al. '690 in view of Mahawili and Eres et al. These claims, dependent on Claim 19, are patentable for the reasons discussed above with regard to Claim 19. Thus, neither Bates et al. nor Eres et al. compensate for the deficiencies of the combination of Heinecke et al. '690 and Mahawili since neither teaches an RF electromagnetic field having an energy level which varies between at least two values, each sufficient to maintain the plasma.

JOHNSON et al.

In view of the above, it is believed this application is in condition for allowance, and as such a Notice is respectfully solicited.

Respectfully Submitted,
PILLSBURY WINTHROP LLP

By: 

Dale S. Lazar

Reg. No.: 28,872

Tel. No.: (703) 905-2126

Fax No.: (703) 905-2500

DSL:sm

1600 Tysons Boulevard
McLean, VA 22102
(703) 905-2000